WHAT IS CLAIMED IS:

1. A storage device control apparatus comprising:

a mounting part capable of removably mounting;

channel control units, each with a host interface controller 310 formed therein for receiving data I/O requests,

disk control units, each with a disk interface controller formed therein for performing I/O control of the data to storage volumes storing data in response to the data I/O requests,

cache memory units, each with a memory formed therein for storing the data, and

storage control units, each with the host interface controller, the disk interface controller, and the memory formed therein; and

an internal connection part for connecting said channel control units, said disk control units, said cache memory units, and said storage control units in a communicable manner.

2. A storage device control apparatus according to claim 1, wherein information for specifying the storage volumes to which one storage control unit performs I/O control is stored in the memory of said storage control unit, and

at least either of information for specifying the storage volumes to which said disk control unit

performs I/O control and information for specifying the storage volumes to which another storage control unit performs I/O control is stored in the memory of said storage control unit.

3. A storage device control apparatus according to claim 1, wherein the memory of said storage control unit has

a first storage area for storing the data to be stored in the storage volumes to which said storage control unit performs I/O control, and

a second storage area for storing the data to be stored in the storage volumes to which said disk control unit performs I/O control, and

information for specifying the first and second storage areas are stored in the memory of said storage control unit.

4. A storage device control apparatus according to claim 1, wherein said storage control unit includes a communication buffer for storing data exchanged with another storage control unit.

5. A control method for a storage device control apparatus including:

a mounting part capable of removably mounting

channel control units, each with a host interface controller formed therein for receiving data I/O requests,

disk control units, each with a disk interface controller formed therein for performing I/O

control of the data to storage volumes storing data in response to the data I/O requests,

cache memory units, each with a memory formed therein for storing the data,

storage control units, each with the host interface controller, the disk interface controller, and the memory formed therein; and

an internal connection part for connecting the channel control unit, the disk control unit, the cache memory unit, and the storage control unit in a communicable manner, in which

a plurality of the storage control units which hold in each memory at least information for identifying a unit to perform I/O control to a storage volume to which each data I/O request is directed are mounted in the mounting part, said control method comprising the steps of:

receiving the data I/O request at one of said storage control unit;

referring to the information by the storage control unit to identify the unit to perform I/O control to the storage volume to which the data I/O request is directed; and

performing the I/O control by the storage control unit when the unit to perform the I/O control is the storage control unit, or letting another storage control unit perform the I/O control when the unit to perform the I/O control is not the storage control

unit.

6. A control method according to claim 5, wherein when the data I/O request received by one of the storage control units is a data read request, and the unit to perform the I/O control is not the storage control unit, said step of carrying out the I/O control by another storage control unit comprises the steps of:

sending the read request to another storage control unit by the storage control unit;

performing the I/O control in response to the read request by another storage control unit;

receiving data from another storage control unit by the storage control unit; and

sending the received data to an information processing apparatus by the storage control unit.

7. A control method according to claim 5, wherein when the data I/O request received by one of the storage control units is a data write request, and the unit to perform the I/O control is not the storage control unit, said step of performing the I/O control by another storage control unit comprises the steps of:

sending the write request and write data to another storage control unit by the storage control unit; and

performing the I/O control of the write data in response to the write request by another storage control unit.

8. A control method according to claim 7,

further comprising the steps of:

receiving from another storage control unit data indicating that the I/O control of the write data has been completed by the storage control unit; and

sending the information processing apparatus data indicating that the I/O control has been completed, by the storage control unit.

9. A control method according to claim 6, wherein the storage control unit includes a communication buffer for storing data exchanged with another storage control unit,

said step of sending the read request to another storage control unit by the storage control unit comprises the steps of,

writing the read request into a communication buffer provided in another storage control unit by the storage control unit, and

reading the read request from the communication buffer of another storage control unit by the own unit, and

said step of receiving the data from another storage control unit by the storage control unit is the step of,

reading the data written by another storage control unit in the communication buffer provided in the storage control unit by the storage control unit.

10. A control method according to claim 7, wherein the storage control unit includes a

communication buffer for storing data exchanged with another storage control unit, and

said step of sending the write request and the write data to another storage control unit by the storage control unit comprises the steps of,

writing the write request and the write data into a communication buffer provided in another storage control unit by the storage control unit, and

reading the write request and the write data from the communication buffer of another storage control unit by the own unit.

11. A control method according to claim 8, wherein the storage control unit includes a communication buffer for storing data exchanged with another storage control unit, and

said step of receiving data indicating that the I/O control of the write data has been completed from another storage control unit by the storage control unit, is the step of,

reading the data written by another storage control unit in the communication buffer provided in the storage control unit by itself.

12. A control method according to claim 5, wherein at least one storage control unit and one disk control unit are mounted in the mounting part, said method comprising the steps of:

receiving the data I/O request by the storage control unit;

referring to the information by the storage control unit to identify the unit to perform the I/O control to the storage volume to which the I/O request is directed; and

performing the I/O control by the storage control unit when the unit to perform the I/O control is the storage control unit, or performing the I/O control by the disk control unit when the unit to perform the I/O control is not the storage control unit.

13. A control method according to claim 12, wherein when the data I/O request received by the storage control unit is a data read request, and the unit to perform the I/O control is not the storage control unit, said step of performing the I/O control by the disk control unit comprises the steps of:

sending the read request to the disk control unit by the storage control unit;

performing the I/O control in response to the read request by the disk control unit;

receiving data from the disk control unit by the storage control unit; and

sending the received data to an information processing apparatus by the storage control unit.

14. A control method according to claim 12, wherein when the data I/O request received by the storage control unit is a data write request, and the unit to perform the I/O control is not the storage

control unit, said step of performing the I/O control by the disk control unit comprises the steps of:

sending the write request and write data to the disk control unit by the storage control unit; and

performing the I/O control of the write data in response to the write request by the storage control unit.

15. A control method according to claim 12, wherein the memory of the storage control unit includes

a first storage area for storing the data to be stored in the storage volumes to which the storage control unit performs I/O control, and

a second storage area for storing the data to be stored in the storage volumes to which the disk control unit performs I/O control, wherein

when the unit to perform the I/O control is the storage control unit, the storage control unit performs the I/O control of the data to the first storage area, or

when the unit to perform the I/O control is not the storage control unit, the disk control unit performs the I/O control of the data to the second storage area.

16. A control method according to claim 5, wherein a plurality of storage control units and at least one disk control unit are mounted in the mounting part, said method comprising the steps of:

receiving the data I/O request by one of the

storage control units;

referring to the information by the storage control unit to identify the unit to perform the I/O control to the storage volume to which the data I/O request is directed; and

performing the I/O control by the storage control unit when the unit to perform the I/O control is the storage control unit, performing the I/O control by the disk control unit when the unit to perform the I/O control is the disk unit, or performing the I/O control by another storage control unit when the unit to perform the I/O control is another storage control unit.

17. A control method according to claim 5, wherein which at least one storage control unit, one disk control unit, and one cache memory unit are mounted in the mounting part, wherein the memory of the storage control unit includes

a first storage area for storing the data to be stored in the storage volumes to which the storage control unit performs I/O control, and

a second storage area for storing the data to be stored in the storage volumes to which the disk control unit performs I/O control, wherein

said control method comprises the steps of:

receiving a data I/O request by the storage control unit;

referring to the information by the storage

control unit to identify the unit to perform the I/O control to the storage volume to which the data I/O request is directed;

performing the I/O control to the first storage area by the storage control unit when the unit to perform the I/O control is the storage control unit;

performing the I/O control to the cache memory unit by the storage control unit when the data is not stored in the first storage area; and

performing the I/O control to the storage volume by the storage control unit when the data is not stored in the cache memory unit.

18. A control method according to claim 5, wherein at least one storage control unit, one disk control unit, and one cache memory unit are mounted in the mounting part, wherein the memory of the storage control unit includes

a first storage area for storing the data to be stored in the storage volumes to which the storage control unit performs I/O control, and

a second storage area for storing the data to be stored in the storage volumes to which the disk control unit performs I/O control, wherein

said control method comprises the steps of:

receiving a data I/O request by the storage control unit;

referring to the information by the storage control unit to identify the unit to perform the I/O

control to the storage volume to which the data I/O request is directed;

performing the I/O control to the second storage area by the storage control unit when the unit to perform the I/O control is the disk control unit;

performing the I/O control to the cache memory unit by the storage control unit when the data is not stored in the second storage area; and

performing the I/O control to the storage volume by the storage control unit when the data is not stored in the cache memory unit.

19. A control method according to claim 5, wherein when the cache memory unit is mounted in the mounting part, said control method further comprising the step of,

duplicating information stored in the memory of each of the storage control units by each of the storage control units, for identifying the unit to perform the I/O control to the storage volume to which the data I/O request is directed, and write the duplicated information into the cache memory unit, wherein

said step of referring to the information by the storage control unit to identify the unit to perform the I/O control to the storage volume to which the I/O request is directed comprises

a step of referring to the information in the cache memory unit by the storage control unit to

identify the unit when the storage control unit cannot identify the unit merely by consulting the information stored in the memory of the storage control unit.

20. A control method according to claim 5, whrerein the disk control unit is mounted in the mounting part, said control method further comprising the steps of:

duplicating the data stored in the storage volume to which the storage control unit performs I/O control by one of the storage control units, and write the duplicated data into the storage volume to which the disk control unit performs I/O control; and

changing the information, stored in the respective memories of the storage control unit and another storage control unit for identifying the unit to perform the I/O control, from the storage control unit to the disk control unit.